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U S NAVY RESPONSE TO SOUTH CAROLINA DEPARTMENT OF HEALTH AND  
ENVIRONMENTAL CONTROL COMMENTS RCRA FACILITY INVESTIGATION ADDENDUM  
AND CORRECTIVE MEASURES STUDY WORK PLAN AREA OF CONCERN 596 (AOC 596)  
ZONE E CNC CHARLESTON SC  
3/13/2003  
CH2M HILL

AOC 596 Zone E  
RFE Report Addendum + CWB Workplan

# CH2MHILL TRANSMITTAL

**To:** Jerry Stamps  
South Carolina Department of Health  
and Environmental Control  
Bureau of Land and Waste  
Management  
2600 Bull Street  
Columbia, SC 29201

**From:** Dean Williamson/CH2M-Jones

**Date:** March 13, 2003

**Re:** CH2M-Jones' Responses to Comments by SCDHEC regarding the *RFI Report Addendum and CMS Work Plan, AOC 596, Zone E, Revision 0*

Quantity	Description
4	CH2M-Jones' Responses to Comments by SCDHEC regarding the <i>RFI Report Addendum and CMS Work Plan, AOC 596, Zone E, Revision 0</i> – Originally Submitted on November 20, 2002

If material received is not as listed, please notify us at once.

Remarks:

Copy To:

Gil Rennhack/SCDHEC, w/att  
Mansour Malik/SCDHEC, w/att  
Dann Spariosu/USEPA, w/att  
Rob Harrell/Navy, w/att  
Gary Foster/CH2M-Jones, w/att



### Engineering Comments Prepared by Gilbert Rennhack

1. Figure 2-1 does not indicate the soil sampling location of:
  - a. E596SB005
  - b. E596SB008

#### **CH2M-Jones Response:**

*The Zone E RFI Report, Revision 0 (EnSafe, 1997) indicates in Section 10.45.1 that the soil boring at E569SB008 could not be advanced due to the thickness of the cement floor being greater than 3 feet. Therefore, no sample was taken at E596SB008. Figure 2-1 inadvertently omitted the location of E596SB005. A copy of the revised Figure 2-1 is attached and will be included in the Revision 1 of the RFI Report Addendum/CMS Work Plan (RFIRA/CMSWP).*

2. Figure 4-1 does not indicate the soil sampling location of: E596SB008

#### **CH2M-Jones Response:**

*Please response to Comment 1.*

3. Additional soil sampling is required to delineate the BEQ contamination area associated with soil sample E596SB006 even though soil sample E596SB014 indicated "no detections of carcinogenic polycyclic aromatic hydrocarbons (PAHs)(i.e. BEQ) above laboratory detection limits in the surface soil sample." Given the very high detection of BEQs in the surface soil, E596SB006 should be bracketed to ensure that the BEQ contamination is fully delineated.

#### **CH2M-Jones Response:**

*Boring E596SB006 is already "bracketed" by borings E596SB005, E596SB007, and E596SB013 (see attached Figure 2-1). None of these three soil borings had BEQs greater than the sitewide reference concentration.*

*During its review of the sampling and analysis plan for AOC 596, in which the collection of sample E596SB014 was proposed, the Department stated it believed additional samples for BEQs may be advisable. However, in their comments, the Department also stated " Though the Department will not prevent the Navy from collecting this sample, the Department will opt to use the more conservative result in making decisions regarding this site."*

*During subsequent conversations regarding these comments, the Department indicated that it was concerned that should the new sample at E596SB014 not indicate the presence of BEQ contamination, the CH2M-Jones/Navy team would attempt to disregard the BEQ results from boring E596SB006.*

*Although the results from E596SB014 do not confirm the presence of elevated BEQs at this location, the CH2M-Jones/Navy team has not attempted to disregard the results from boring E596SB006, nor is the CH2M-Jones/Navy team asking for an NFA determination for AOC 596. Consistent with SCDHEC's request to consider the BEQ results from E596SB006 as valid and consistent with other recent decisions regarding retaining BEQs as chemicals of concern (COCs) at several CNC sites, BEQs have been retained as a COC for this site, and a CMS is recommended.*

*However, the lack of repeatability of the elevated BEQ concentrations at this location indicates that there is no source area of BEQs at this location, and surrounding soil boring locations do not show elevated BEQ detections. The sample results for boring E596SB014, which do not show any detectable BEQs, also cannot be disregarded. BEQ concentrations in surrounding soil samples also do not point to the presence of a source area of BEQs at AOC 596.*

*Because BEQs (as well as arsenic in surface soil for the unrestricted land use scenario) are being retained as a COC and the site will, at a minimum, have Land Use Controls as corrective measures, additional delineation for BEQs is not warranted. The RFI delineation requirements, as described in the CNC Project Team Notebook (CH2M-Jones, December 2001), have been achieved and we believe the RFI is complete and adequate for effective corrective measure planning purposes.*

*Should a future redeveloper determine that it would like to achieve unrestricted land use for this site, additional sampling and analysis for BEQs and arsenic may be warranted, in addition to any required corrective measures.*

## Hydrogeology Comments Prepared by Mansour Malik

### 1. Section 2.1.2 Subsurface Soil Results.

The text stated that "detections of organic compounds were compared with generic soil screening levels (SSLs) using a dilution attenuation factor (DAF)=10." The text should verify whether that includes the VOCs, which should be screened using a DAF of 1.00.

#### **CH2M-Jones Response:**

*Section 2.0 of the RFIRA/CMSWP summarizes the RFI activities detailed in the Zone E RFI Report, Revision 0 (EnSafe, 1997) only, and does not reflect chemical of potential concern (COPC) screening criteria currently adopted by the CNC BCT. Subsurface VOC detections were screened during the initial RFI using an SSL with a DAF=10, whereas current COPC criteria adopted by the BCT includes comparison of surface and subsurface VOC detections with SSLs (with a DAF=1).*

*This screening of VOCs against SSLs with a DAF=1 was done during the preparation of this RFIRA/CMSWP, as detailed in Section 5.0 of the RFIRA.*

### 2. Section 5.2.3 "Thallium," line 10-12.

The text stated, .....*"Zone E thallium background concentration for deep groundwater is 7.0 µg/L. These intermittent detections of thallium above MCLS have been observed sitewide at CNC and represent naturally occurring conditions."* This statement is not justifiable enough. From 1943 to 1946, the site hosted a machine shop, and it was used as a galvanizing plant. It is known that Thallium is a byproduct that can be recovered from flue dust and residuals that result from the smelting of zinc, copper, and lead ores through treatment by electrolysis, precipitation, or reduction (HSBD 1989; Sax and Lewis 1987; U.S. Bureau of Mines 1983, 1988). The thallium occurrence is possibly linked to the site history. In the absence of knowledge of what types of thallium species are present, the rate of mobility from one medium to another and the solubility cannot be defined. The statement should be revised to either reflect those facts or support the "naturally occurring" claim with further clarification.

#### **CH2M-Jones Response:**

*We agree that the occurrence of thallium in groundwater as a background contaminant can be better clarified, and will offer some suggestions below as to how to best accomplish this. However, a few notes regarding the reviewer's comments about the antimony being site-related are first offered.*

*The reviewer's statement that this building was used as a galvanizing plant cannot be confirmed by our review of the RCRA documents. The site history for Building 101 (AOC 596) provided in the RCRA Facility Assessment (RFA) does not indicate the presence of any galvanizing operations in this building. The RFA indicates that the building was used as a machine shop and a storehouse in support of the galvanizing plant. There is no indication in the RFA that this building was a location at which smelting of zinc, copper, and lead ores through electrolysis, precipitation, or reduction occurred. A machine shop/material storehouse cannot be equated to an ore smelting operation. Accordingly, we disagree with the reviewer's claim that because thallium may be a chemical potentially associated with a zinc, copper, or lead ore smelting operation, thallium should be considered a site-related chemical at this site.*

*The materials of concern identified for this site in the RFA did not include metals, although metals analysis was performed as part of the standard suite of analysis parameters used during the RFIs at CNC. There is no supporting information to suggest that this site was impacted by galvanizing operations. Zinc concentrations in soils were not elevated.*

*Detections of thallium in groundwater above its maximum contaminant level (MCL) in groundwater wells basewide at CNC have been noted and discussed by the CNC BCT previously. It has been recognized by the BCT that these detections above the MCL could represent naturally occurring conditions, especially in cases where these elevated detections are preceded or succeeded by lack of detections of thallium above laboratory detection limits, as is the case at AOC 596. As indicated in Section 5.2.3 and Table 5-2, the detection in shallow groundwater of 6.7 micrograms per liter ( $\mu\text{g/L}$ ) in well E596GW003 was preceded by three consecutive detections below laboratory detection limits.*

*Although not stated in the RFIRA, the detection in deep groundwater of 7  $\mu\text{g/L}$  was also preceded by three consecutive detections below laboratory detection limits. These data are presented in Table 5-2. The text will be revised to reflect this information.*

*During the October 2000 BCT meeting, a summary of the occurrence of low level (i.e., "J-flagged") detections of thallium, antimony, and arsenic in groundwater samples from both grid and non-grid wells was presented by CH2M-Jones. For thallium, the shallow grid (background) wells had an occurrence of J-flagged values (above the MCL of 2 parts per billion [ppb]) in approximately 10.4 percent of the samples (32 out of 307 total samples in the database at that time). Similar results occurred for the non-grid wells, with a J-flagged occurrence of approximately 11.6 percent (171 out of 1,479 samples).*

*For groundwater samples from deep wells, a similar frequency of occurrence was found. For deep grid wells, J-flagged values occurred in 13.7 percent (41 of 300 samples), and in non-grid deep wells, J-flagged values occurred in 14.8 percent (36 out of 243 samples).*

*There are no known thallium sources that would account for the frequency of occurrence in the grid wells across the CNC. Similarly, no thallium groundwater "plumes" have been identified at any of the hundreds of SWMUs or AOCs at the CNC.*

*The frequency of occurrence of "J-flagged" thallium detections at AOC 596 is 6.25 percent for the shallow wells (one out of 16 samples), and 12.5 percent (one out of eight samples) for the deep wells. These frequencies of occurrence are less than those found in both the background and non-grid well samples across the base. Thus, these results do not suggest an unusually high frequency of occurrence compared to background. In the absence of an identifiable thallium source area in soil, the most likely explanation for the J-flagged thallium occurrence in the groundwater samples at AOC 596 is the same as its occurrence at 10 to 13 percent of the grid wells - due to general site background conditions.*

*In soil samples from 12 soil borings at the site, there were three detections in surface soil samples and five detections in subsurface soil samples above laboratory detection limits. These infrequent detections do not indicate a sitewide presence of thallium in soils, thus indicating a lack of connection between historic site activities and thallium detections. All of the surface and subsurface soil detections were below respective COPC screening criteria, indicating that there is no threat to groundwater from the detections of thallium in soil.*

3. The text in Section 5.2.3 (Line 13-14) "Thallium" stated, "*There is no indication that a release of thallium has occurred in groundwater at the site due to site activities. Elevated concentrations of thallium in soil were not observed.*" To support this statement the text should include the thallium analysis results for both the surface and subsurface soil.

**CH2M-Jones Response:**

*The range of thallium detections in soil have been previously provided in the Zone E RFI Report, Revision 0 (EnSafe, 1997), and can also be found in the excerpt from the RFI Report included in Appendix A of the RFIRA/CMSWP. The text will be updated to include the maximum thallium concentrations detected in surface and subsurface soils at the site, with clarification that thallium concentrations did not exceed background levels.*

4. The word "elevated" underlined from comment #3 does not indicate the concentration levels referenced. The statement should be revised to reflect the range of concentrations values.

**CH2M-Jones Response:**

*Please see response to Comment 3.*

5. Section 5.2.2 Lead, page 5.5, Line 2.

*"It is also noted that no elevated concentrations were found in the soil samples." Lead concentrations in surface soil ranges from 25 mg/kg to 317 mg/kg. In the subsurface soil concentrations range from 4.7 to 16.2 mg/kg. Specific lead concentrations should be referenced.*

**CH2M-Jones Response:**

*The text will be updated to mention that the maximum detected lead concentration in surface soil of 317 milligrams per kilogram (mg/kg) was below the target cleanup goal for unrestricted land use for lead of 400 mg/kg, and that the maximum detected lead concentration in subsurface soil of 65.4 mg/kg was below the generic SSL (with a DAF=10) for lead of 400 mg/kg.*

6. Appendix D.

The chain of custody (COC) form attached only reflects the data from 3 soil samples. The report must include all the COC forms. Please include required forms.

**CH2M-Jones Response:**

*The RFIRA/CMSWP includes the chain of custody forms for only the additional soil sampling conducted by CH2M-Jones during 2002. The chain of custody forms for historic RFI sampling were previously provided by the Navy/EnSafe team in the Zone E RFI Report, Revision 0.*

7. The report lacks the well and the DPT logs. Please include all the logs pertinent to the site evaluation.

**CH2M-Jones Response:**

*No DPTs were introduced as part of the RFI for AOC 596. Groundwater monitoring wells were installed as part of the initial RFI effort during 1995. Well logs for the RFI well installations have been provided as part of Appendix A of the Zone E RFI Report, Revision 0 (EnSafe, 1997). No wells were installed as part of additional investigations conducted by CH2M-Jones during 2002.*



8. The CMSWP failed to define the alternative of soil excavation, and to detail how that is proposed to be conducted. Soil extent location figure of the possibly targeted area or areas was not included. The CMS Work Plan section should be revised to reflect that and to include pertinent figures.

**CH2M-Jones Response:**

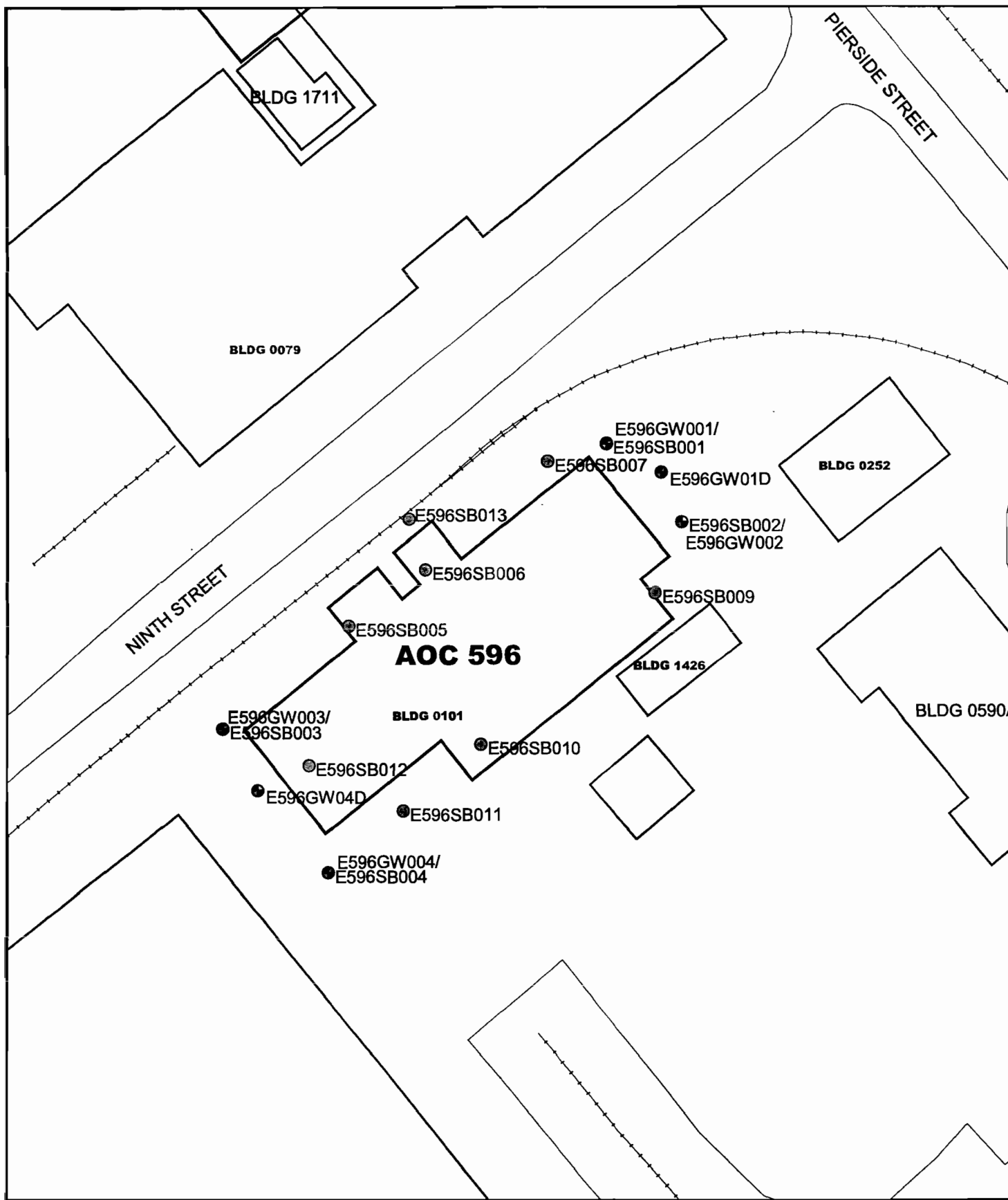
*The detailed description and analysis of the CMS alternatives will be included in the CMS Report, rather than in the CMS Work Plan. Detailed engineering evaluations for corrective measures alternative, including items such as engineering calculations, estimated soil volumes to remove, and figures showing proposed excavation areas are provided in CMS reports, rather than CMS Work Plan. The CMS Work Plan identifies proposed corrective measures and other items such as media cleanup standards (MCSs) and remedial action objectives (RAOs).*

**Conclusion:**

The Division of Hydrogeology recommends revision of this RFIRA/CMSWP to address the comments above. For any further questions please contact Mansour Malik at (803) 896-4169, or email at [malikmn@dhec.state.gov](mailto:malikmn@dhec.state.gov).

**Attachment**

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**Figure 2-1**  
RFI Sampling Locations  
AOC 596, Zone E  
Charleston Naval Complex

**CH2MHILL**